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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,235	12/03/2001	Sadao Kadokura	011516	5061

23850 7590 04/07/2003

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 04/07/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/998,235

Applicant(s)

KADOKURA, SADA O

Examiner

Steven H VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 is/are allowed.
- 6) ☒ Claim(s) 1,3-5,8,9,11,13 and 19 is/are rejected.
- 7) ☒ Claim(s) 6,7,10,12 and 14-18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 07 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Drawings***

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on March 6, 2003 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### ***Claim Objections***

2. Claims 6, 18, and 19 are objected to because of the following informalities: "is" should be "are" in claims 6 and 19 at lines 2 and 13 respectively; and "are" should be "is" in claim 18, line 2. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 3 is out of scope with newly amended claim 2. Claim 3 requires "the side face which opposes the opening facing said substrate holder" to be "covered with a target unit". Claim 2, from which claim 3 depends, already requires that the substrate is caused "to face the opening remaining open". The side face that opposes the opening facing the substrate holder is the side that holds the substrate holder. Therefore, requiring that the side that the substrate holder is one have a target is out of scope with claim 2.

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6. Claim 19 recites the limitation "the paired targets" in line 5. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 4, 5, 8, 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,842,708 to Kadokura et al. (Kadokura) in view of US 4,931,169 to Scherer et al. (Scherer) and US 4,784,739 to Kadokura et al. (Kadokura II).

9. For claim 1, Applicant requires a facing-targets sputtering apparatus comprising a vacuum chamber, a pair of target units with targets facing the vacuum chamber, a substrate holder beside a discharge space between the targets, and a power supply unit for supplying DC power and HF power to the targets. Each target unit has a cooling block, a magnetic field generation means, and electron reflection means for reflecting an electron to the discharge space.

10. For claim 4, Applicant requires a facing-targets sputtering method comprising: generating a magnetic field extending between two targets that are a predetermined distance away from each other so as to surround a discharge space between the targets and performing sputtering. During sputtering, electrons are reflected by use of electron reflection means and power is generated by HF power and DC power applied to the targets.

11. Kadokura discloses a facing targets sputtering apparatus (Figure 1) comprising a vacuum chamber 10, a pair of target units 15, 16 that each have targets T<sub>1</sub>, T<sub>2</sub>, a substrate holder 41 at the

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side of a discharge space between the targets (Figure 1), and a power supply to the targets 50.

Magnetic means 152, 162 are also preset as well as a cooling block 151, 161 for each target.

Kadokura also discloses a sputtering mean using the apparatus (Example 1).

12. Kadokura does not disclose HF and DC power to the targets or an electron reflection means.

13. Scherer discloses that adding a HF component of power over a DC component of power is beneficial because it eliminates arcing (col. 3, l. 45-50).

14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kadokura to utilize HF power with the DC power because of the desire to eliminate arcing.

15. Kadokura II discloses that an electron-reflecting electron is beneficial in a facing target sputtering apparatus because it reflects or rebounds electrons away from the magnetic means (col. 6, l. 16-21).

16. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kadokura to utilize electron reflection means because of the desire to reflect electrons away from the magnetic means.

17. For claim 5, Applicant requires a circular magnetic field to be generated at a peripheral edge of the target. The magnetic arrangement of Kadokura would also have a circular magnetic field at a peripheral edge portion of each target (Figure 7).

18. For claim 8, Applicant requires the electron reflection means and the targets to be made of the same material. Kadokura II discloses that the electron means and targets should be the same material (col. 8, l. 42-47).

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19. For claim 9, Applicant requires the targets to be Cu, Al, or alloys thereof. Kadokura discloses that the targets can be metal (col. 3, l. 19-23). Copper and aluminum are known metals. Use of any known metal is obvious according to Kadokura II.

20. For claim 11, Applicant requires the film to be a conducting film. For claim 13, Applicant requires the film to be a metal film. When copper or aluminum is used (which is obvious as described above), the film is metal and conductive.

#### ***Double Patenting***

21. Applicant is advised that should claim 6 be found allowable, claim 19 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

#### ***Response to Amendment***

22. The objection to the drawings presented in the office action mailed December 19, 2002 is withdrawn in light of the proposed drawing correction.

23. The objection to the specification presented in the office action mailed December 19, 2002 is withdrawn in light of the amendment.

24. The 112-second paragraph rejections presented in the office action mailed December 19, 2002 are withdrawn in light of the amendment. However, it is noted that a new 112-second paragraph rejection is presented above that is necessitated by Applicant's amendment.

25. The 103(a) rejection of claims 10 and 12 over US 4,842,708 to Kadokura et al. (Kadokura) in view of US 4,931,169 to Scherer et al. (Scherer) and US 4,784,739 to Kadokura et

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al. (Kadokura II) presented in the office action mailed December 19, 2002 is withdrawn in light of Applicant's arguments, however, it is noted that the rejection of claims 1, 4, 5, 8, 9, 11, and 13 stands.

*Allowable Subject Matter*

26. Claim 2 is allowed.

27. Claims 7, 10, 12, and 14-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

28. Claims 6 and 18 would be allowable if written to overcome the claim objection presented above.

29. The indicated potential allowability of claim 3 is withdrawn in light of the new 112-second paragraph rejection presented above that was necessitated by Applicant's amendment.

30. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a facing-targets sputtering method as claimed by Applicant in claims 10 and 12 wherein the film is formed at a gas pressure of 0.5 Pa or lower or at a pressure of 0.05 Pa or lower.

31. US 4,842,708 to Kadokura et al. (Kadokura) in view of US 4,931,169 to Scherer et al. (Scherer) and US 4,784,739 to Kadokura et al. (Kadokura II) discloses a pressure of 4 mTorr (Example I, Kadokura) which equals 0.53 Pa. Thus, no reference discloses the specific pressure range claimed by Applicant and such pressure range is not obvious in light of the prior art of record.

*Response to Arguments*

32. Applicant's arguments filed March 7, 2003 have been fully considered but they are not persuasive.

33. Applicant has argued that neither Kadokura nor Kadokura II discloses use of DC and HF power supply. Applicant is correct in that argument, but the argument ignores the teaching of Scherer who does in fact teach the use of adding an HF component to a DC component when sputtering as well as motivation to utilize the HF component.

34. The only issue that appears to be in dispute is the use of HF power with the DC power as taught by Scherer. Applicant argues that there is no description of facing targets or mention of forming the film without damaging the previously formed film as used in Applicant's invention.

35. First, Applicant has not claimed "without damaging the previously formed film" in any of their claims. Secondly, it does not matter that Scherer does not use facing targets. The fact remains that Scherer does provide the teaching of HF power in addition to the DC power and also provides a motivation to use the HF power in addition to the DC power. Admittedly, the motivation to use the HF power in addition to the DC power is for a different reason than that claimed by Applicant, but that does not matter. Applicant's only argument appears to be that Kadokura in view of Kadokura II and Scherer use HF power with DC power for a different reason than Applicant and solve (potentially) a different problem than Applicant.

36. In response to applicant's argument that Scherer does not solve the "newly brought problems", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the



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differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

37. Here, the examiner has shown motivation to combine the references that is found in the prior art. There is a reasonable probability of success because Scherer has already shown that using HF power with DC power is successful. Thus, the examiner has in fact made a *prima facie* case of obviousness.

### *Conclusion*

38. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

In the event that papers are missing from this communication, please contact the Customer Service Center for Technology Center 1700 at (703) 306-5665.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (703) 305-4473. The examiner can normally be reached on Mon - Thurs (7:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
April 3, 2003